increased risk of asthma and persistent wheezing.

Maternal smoking during pregnancy was associated with an increased risk of asthma, and there was a positive dose-response relation between the number of cigarettes smoked daily and an increased risk of asthma and persistent wheezing.

Higher maternal educational level was associated with a reduced risk of asthma and persistent wheezing; HR 0.58 (95% CI: 0.56-0.59) for those with the highest level of education compared with those with the lowest.

The effect of a range of pollutants was examined but only a positive association between $PM_{2.5}$ and asthma and persistent wheezing was found across all three models used (HR 1.03, 1.04 and 1.05 respectively) and in sensitivity analyses.

The study authors conclude: 'The findings from this study strengthen the evidence that parental asthma, parental education, and maternal smoking during pregnancy are risk factors for onset of asthma and persistent wheezing in children.

'Moreover, we found that children exposed to high levels of $PM_{2.5}$ were more likely to develop asthma and to have persistent wheezing. These findings therefore support emerging evidence that exposure to air pollution might influence the development of asthma.'

'This finding needs to be substantiated in future studies,' they add.

DR PETER SAUL

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Smoking cessation

Nausea may affect adherence to varenicline

Nausea during the first few weeks of varenicline therapy may reduce adherence, a study from North America has found.

The authors analysed data on 870 adults receiving varenicline in two smoking cessation trials conducted at multiple sites in Canada and the United States. A total of 449 were taking part in the Quit2Live and 421 in the Pharmacogenetics of Nicotine Addiction Treatment (PNAT) trial.

Information on nausea severity was self-reported and adherence to treatment was assessed by measuring plasma or salivary varenicline concentration. Smoking abstinence was confirmed with either cotinine or carbon monoxide testing at a range of study time points.

At week 12, of the 381 participants for whom full data were available in Quit2Live, 108 had stopped smoking and 273 were still smoking. Respective values for PNAT were 144 (of 376) and 232.

Early nausea was indirectly associated with lower cessation rates at multiple time points in Quit2Live; odds ratios (OR) ranging from 0.92 (95% CI: 0.83-0.99) to 0.94 (95% CI: 0.86–0.99). This relationship was associated with reduced varenicline adherence (assessed by plasma varenicline levels).

The relationship between nausea, adherence and cessation was similar in direction but weaker in effect size; ORs ranging from 0.98 (95% CI: 0.90-1.01) to 0.99 (95% CI: 0.95-1.03) in PNAT, where adherence was assessed using salivary varenicline levels.

Varenicline has been shown to be an effective pharmacotherapy in helping smokers achieve long-term cessation, significantly increasing stop rates compared with placebo. However up to half of smokers treated with varenicline fail to achieve abstinence,[1] and reduced medication adherence may be one factor contributing to failure to quit.

Previous studies have shown that a third of varenicline-treated smokers were non-adherent by the second treatment week (one week post-dose titration),[1] and non-adherent smokers are significantly less likely to be abstinent at a range of treatment time points. In surveys investigating discontinuation of, and non-adherence with, varenicline the most frequently cited reason was adverse events, the most common being nausea.[1] Nausea in varenicline treated patients is generally mild to moderate, starting in the first 2 weeks of treatment and diminishing over the course of treatment.

The authors say that better management of early nausea during varenicline treatment may improve smoking cessation success rates by increasing varenicline adherence. They suggest extending the varenicline titration period and/or allowing patients to control the rate of titration and using lower dose regimens (0.5 mg twice daily). Explaining to patients that nausea may occur in the early treatment stages, and that the effect lessens over time, and providing antiemetic medication during early treatment may also help improve adherence, they say.

DR JEZ THOMPSON

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